TASK FORCE WEB

Naval Simulation System (NSS) Web Client Proof-of-Concept

Anh D. Ta, Ph.D.
(ata@mitre.org)

Topics

- Goal & Scope
- Technical Approach
- Technical Challenges
- Proposed Architecture
- CAT Web-based User Interface
- Web Services-based Design
- Lessons Learned
- Possibilities

Proof-of-Concept Goal and Scope

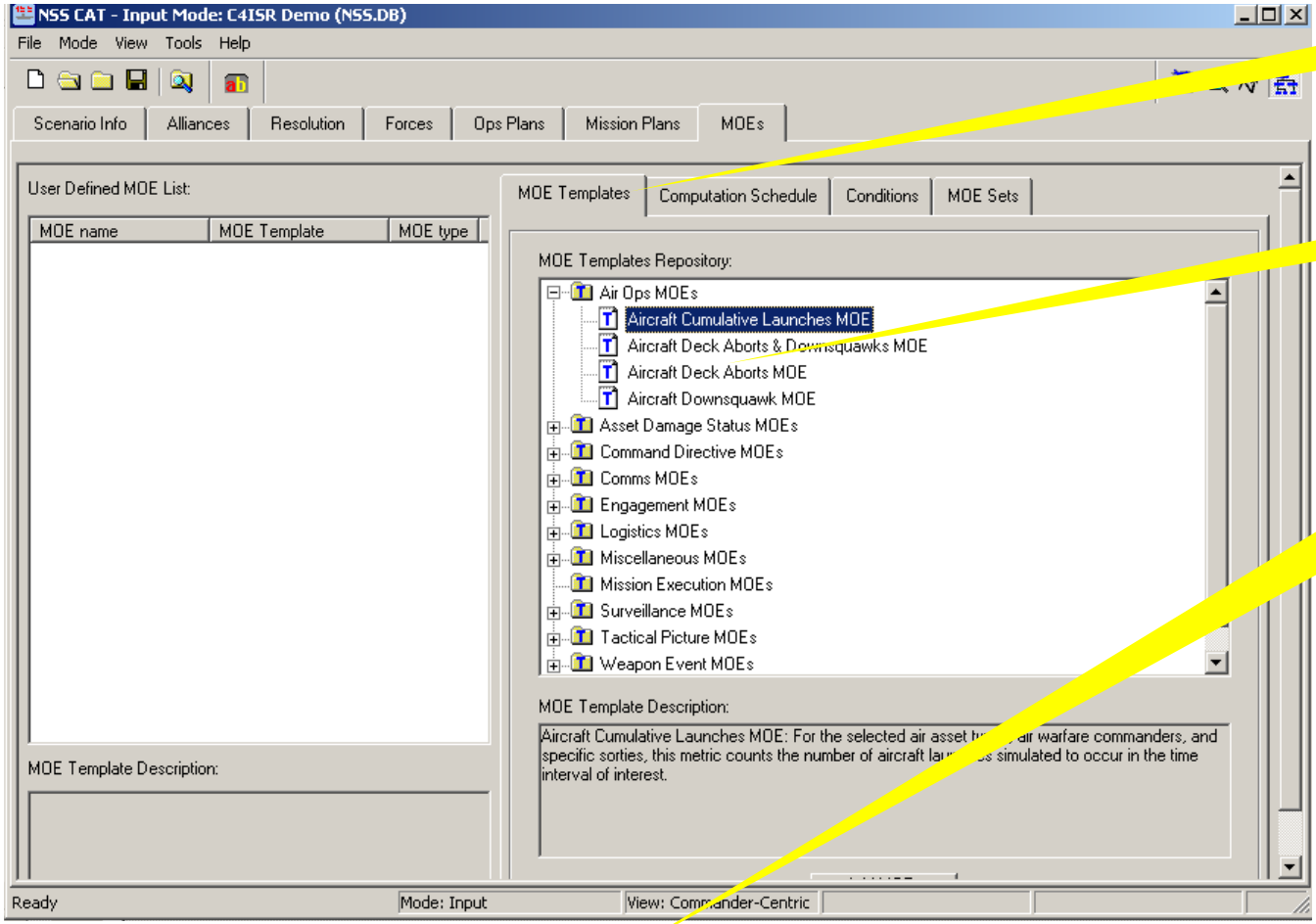
To gain insights into the *technical risks* and *level of effort* required to web enable NSS in accordance with the Web Enable Navy (WEN) enterprise portal architecture standards.

- Use NSS Analyst Edition Version 3.2 baseline
- Two staff months of effort
- Two calendar months

Technical Approach

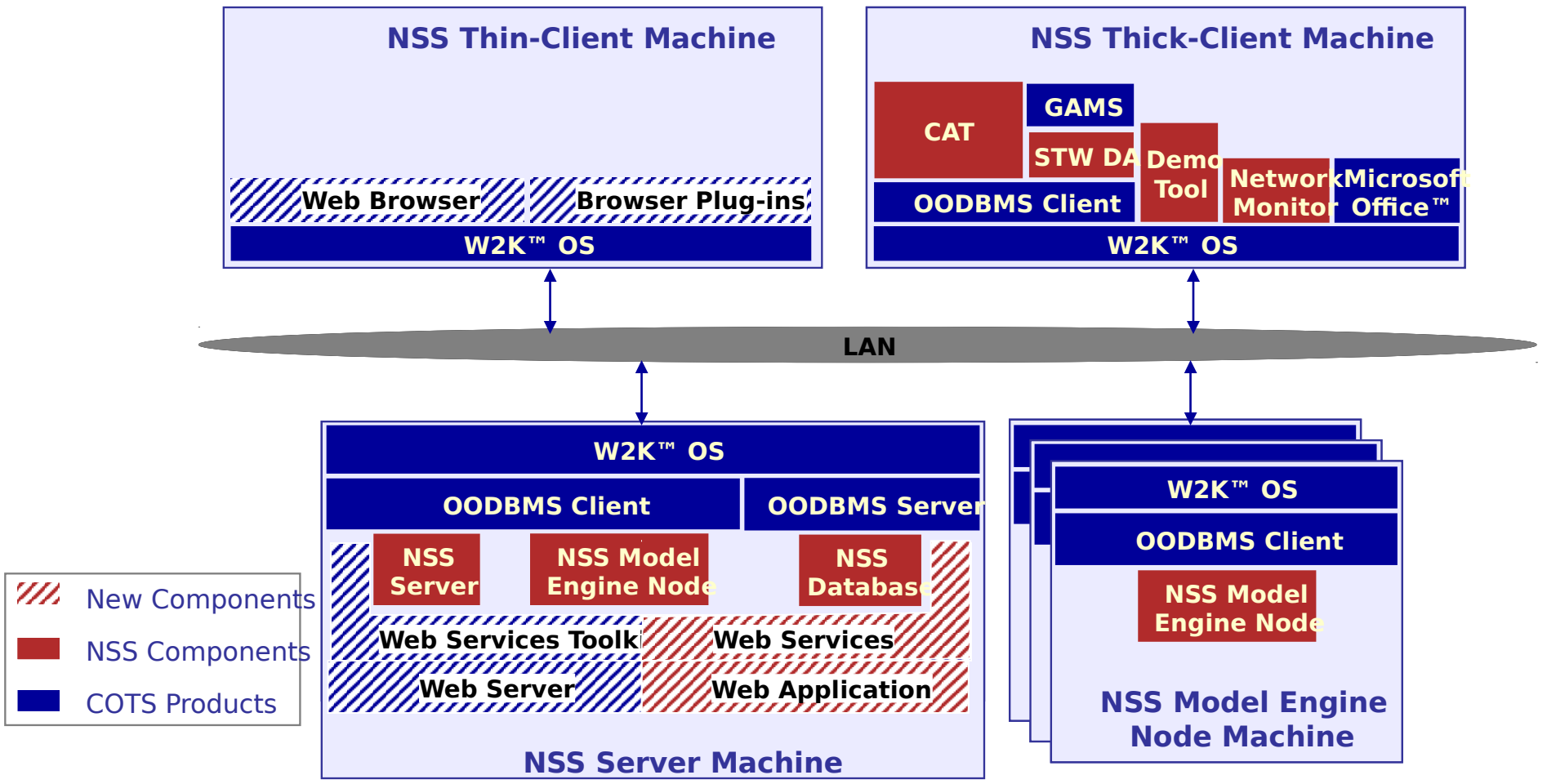
- Identified the minimum set of user interface thread with challenging GUI concepts for a Web client environment
  - Course of Action Analysis Tool (CAT) [1 of 6]
    - Input Mode (1 of 4) [Command-Centric View] (1 of 4)
    - Run/Playback Mode (1 of 4)
- Identified guiding principles in web-enablement
  - Minimize ***GUI changes*** to minimize retraining
  - Maintain or improve ***performance*** by leveraging latest technologies (e.g., XML)
  - Maximize ***reuse*** of components

Technical Challenges



- **Multilevel Tab**
- **Tree View**
- **Context Info**
- **Animated Scenario**

Proposed Architecture



CAT Web-based User Interface

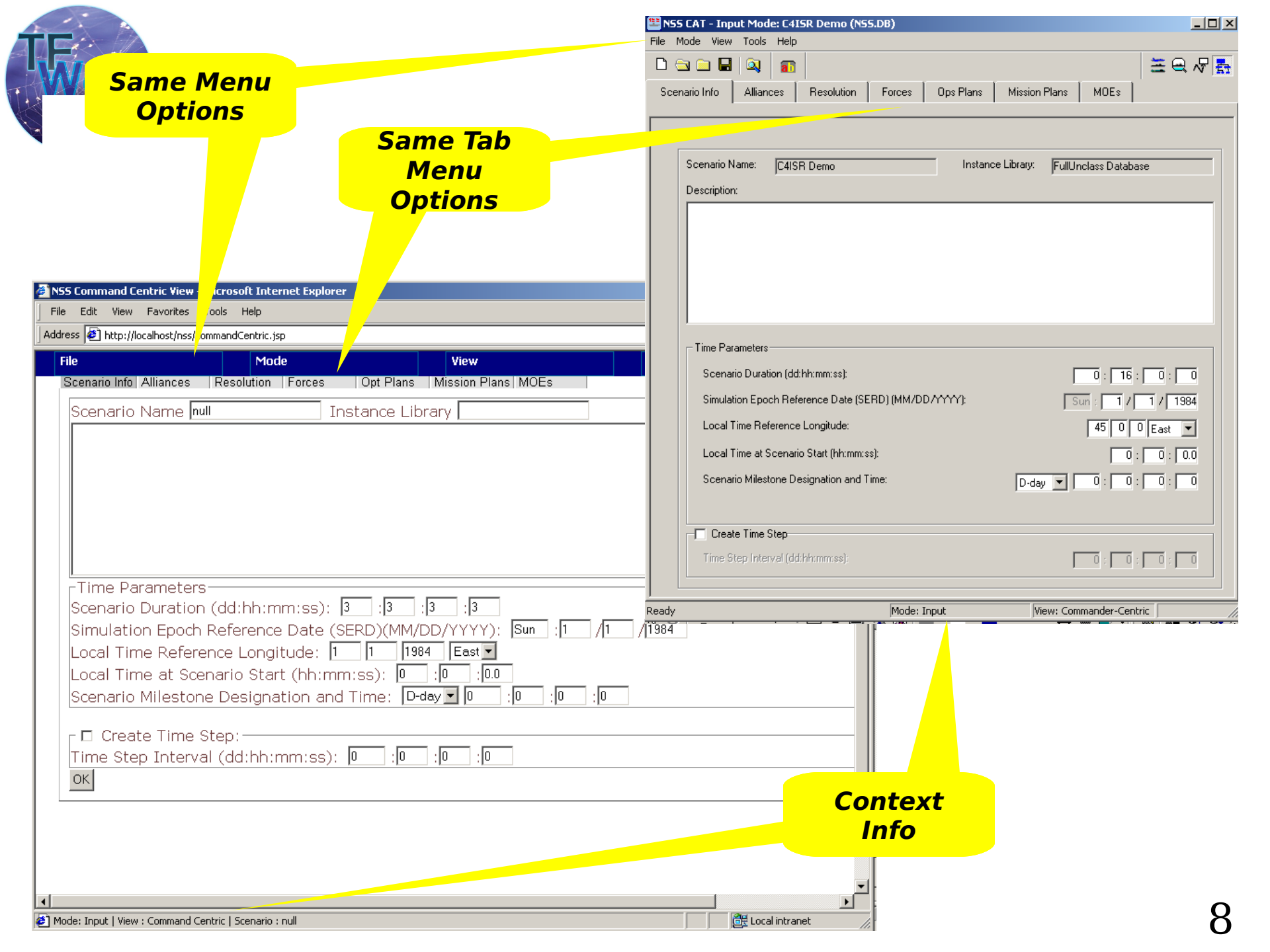
Functional Features

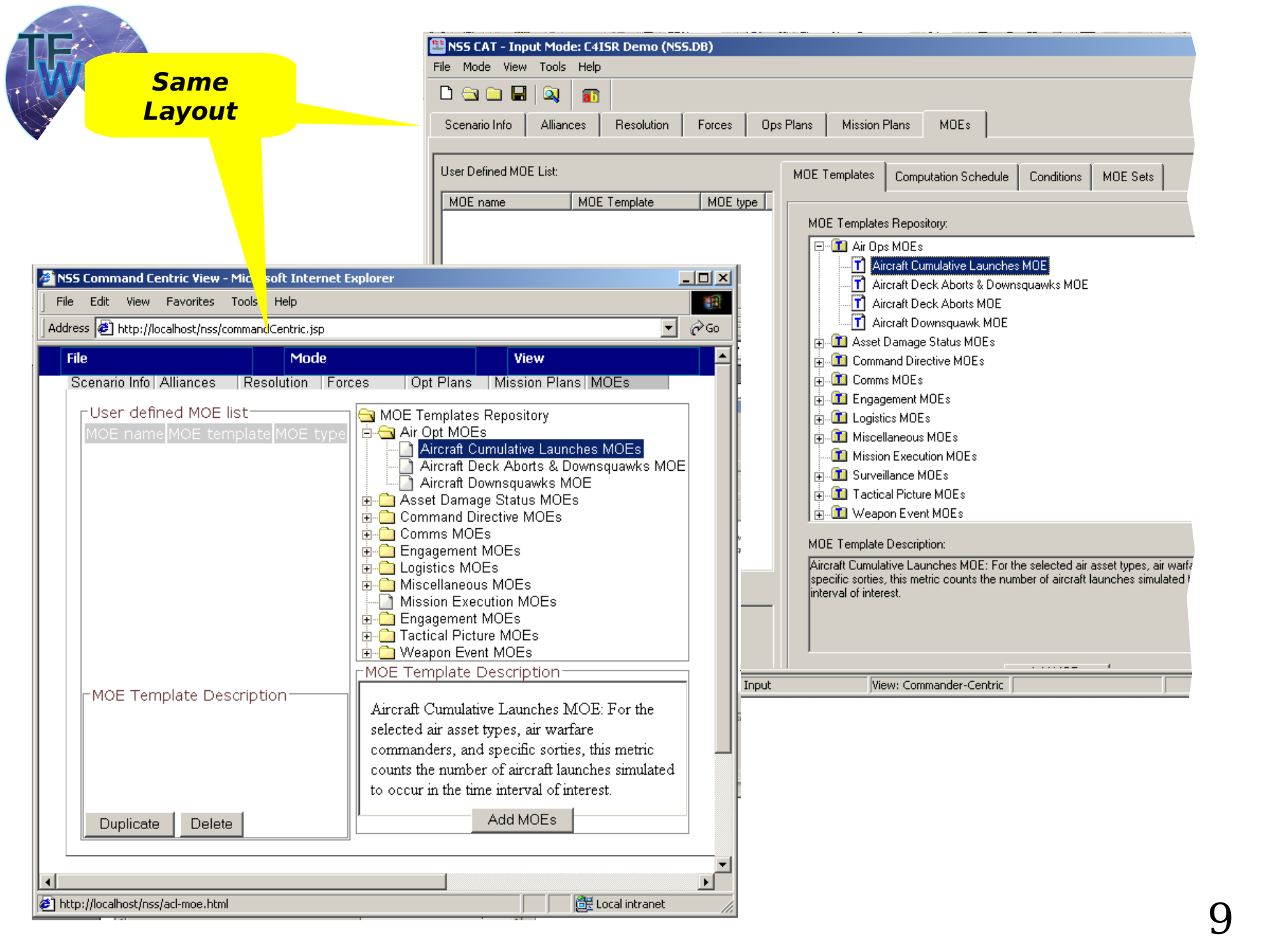
- ✓ Provides similar “look & feel” to thick-client (i.e., layouts and behaviors)
- ✓ Supports dynamic Interface
- ✓ Supports playback animation of scenario in Web browser
- ✓ Eliminates communication with server when
  - ✓ Browsing scenario data
  - ✓ Zoom/Pan scenario playback

Underlying Technologies

- DHTML (Dynamic HTML)
  - XHTML (eXtensible Hypertext Markup Language)
    - GUI Tidy
  - CSS (Cascading Style Sheets)
  - DOM (Document Object Model)
  - JavaScript
- JSP (JavaServer Pages)
- SVG (Scalable Vector Graphic) / SMIL (Synchronized Multimedia Interface Language)
  - Adobe SVG Viewer Plug-in

Standard ***Tools***


Same Menu Options
Same Tab Menu Options
NSS CAT - Input Mode: C4ISR Demo (NSS.DB)
File Mode View Tools Help
Scenario Info Alliances Resolution Forces Ops Plans Mission Plans MOEs
Scenario Name: C4ISR Demo
Instance Library: FullUnclass Database
Description:
Time Parameters
Scenario Duration (dd:hh:mm:ss): 0 : 16 : 0 : 0
Simulation Epoch Reference Date (SERD) (MM/DD/YYYY): Sun 1 / 1 / 1984
Local Time Reference Longitude: 45 0 0 East
Local Time at Scenario Start (hh:mm:ss): 0 : 0 : 0.0
Scenario Milestone Designation and Time: D-day 0 : 0 : 0 : 0
Create Time Step
Time Step Interval (dd:hh:mm:ss): 0 : 0 : 0 : 0
Ready
Mode: Input
View: Commander-Centric
NSS Command Centric View - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://localhost/nss/CommandCentric.jsp
File Mode View
Scenario Info Alliances Resolution Forces Opt Plans Mission Plans MOEs
Scenario Name null
Instance Library
Time Parameters
Scenario Duration (dd:hh:mm:ss): 3 :3 :3 :3
Simulation Epoch Reference Date (SERD)(MM/DD/YYYY): Sun :1 /1 /1984
Local Time Reference Longitude: 1 1 1984 East
Local Time at Scenario Start (hh:mm:ss): 0 :0 :0.0
Scenario Milestone Designation and Time: D-day 0 :0 :0 :0
Create Time Step:
Time Step Interval (dd:hh:mm:ss): 0 :0 :0 :0
OK
Mode: Input | View : Command Centric | Scenario : null
Local intranet
Context Info


Same Layout
NSS CAT - Input Mode: C4ISR Demo (NSS.DB)
File Mode View Tools Help
Scenario Info Alliances Resolution Forces Ops Plans Mission Plans MOEs
User Defined MOE List:
MOE name MOE Template MOE type
MOE Templates Computation Schedule Conditions MOE Sets
MOE Templates Repository:
Air Ops MOEs
Aircraft Cumulative Launches MOE
Aircraft Deck Aborts & Downsquawks MOE
Aircraft Deck Aborts MOE
Aircraft Downsquawk MOE
Asset Damage Status MOEs
Command Directive MOEs
Comms MOEs
Engagement MOEs
Logistics MOEs
Miscellaneous MOEs
Mission Execution MOEs
Surveillance MOEs
Tactical Picture MOEs
Weapon Event MOEs
MOE Template Description:
Aircraft Cumulative Launches MOE: For the selected air asset types, air warfa
specific sorties, this metric counts the number of aircraft launches simulated
interval of interest.
Input
View: Commander-Centric
NSS Command Centric View - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://localhost/nss/commandCentric.jsp
Go
File Mode View
Scenario Info Alliances Resolution Forces Opt Plans Mission Plans MOEs
User defined MOE list
MOE name MOE template MOE type
MOE Templates Repository
Air Opt MOEs
Aircraft Cumulative Launches MOEs
Aircraft Deck Aborts & Downsquawks MOE
Aircraft Downsquawks MOE
Asset Damage Status MOEs
Command Directive MOEs
Comms MOEs
Engagement MOEs
Logistics MOEs
Miscellaneous MOEs
Mission Execution MOEs
Engagement MOEs
Tactical Picture MOEs
Weapon Event MOEs
MOE Template Description
Aircraft Cumulative Launches MOE: For the selected air asset types, air warfare commanders, and specific sorties, this metric counts the number of aircraft launches simulated to occur in the time interval of interest.
MOE Template Description
Duplicate
Delete
Add MOEs
http://localhost/nss/acl-moe.html
Local intranet

NSS Web Services-based Design

Functional Features

- ✓ Supports standard-based, platform-independent, remote requests
  - ✓ Selecting available scenarios
  - ✓ Running simulation with selected scenario
- ✓ Returns URLs for download of simulation outputs

Underlying Technology

- Web Services
  - WSDL (Web Services Description Language)
  - SOAP (Simple Object Access Protocol)
  - XML (eXtensible Markup Language)
  - Apache Axis 1.0
- Web Server / J2EE JSP/Servlets Container
  - Apache Tomcat 4.0.4
  - JDK 1.3.1 (Java Development Kit)

Standard ***Tools***

Lessons Learned

- Existing JavaScipt components support complex GUI concepts in Web interface
- Similar “look and feel” for both types of client minimizes retraining of users
- Maintain compatible performance with thick client via DHTML => DOM + CSS + JavaScript to
  - Inconsistent support for DHTML among Web browsers
- Start with message-based Web services and evolve to service-based Web services
- Codify data in XML will minimize web enablement

Compliance to WEN Enterprise Portal requirements is not hard!

Possibilities….

- Investigate feasibility of exposing thick-client interface (i.e., Visual C++ Windows Foundation Class interfaces) as Web services to access full range of functionality in Web-based client
- Design XML-based format for scenario and playback files to enhance exchanging of model with other simulation tools
- Design 3D view/animation of scenario using X3D and geoVRML
- Design a 100% DOM-based interface to achieve true browser independent
  - IE (5.5+) and Netscape (6)